EECS 361
Homework #1

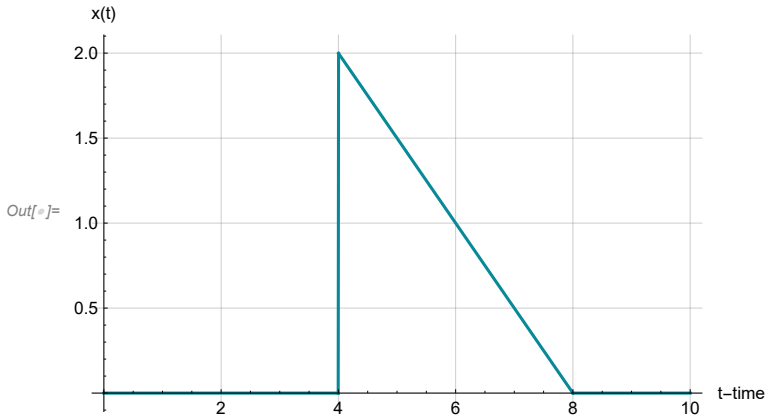
1. Concept questions 2.1.1
2. Participation activities
   2.2.1: Phase angles and quadrants in the complex plane.
   2.2.2: Complex number products and quotient
   2.2.3: Complex algebra
3. Let

   a. $z_1 = 3\text{-}j\ 5$ find
   $\mathrm{Re}(z_1)$, $\mathrm{Im}(z_1)$, $|z_1|$, $|z_1|^2$, find α and β in $z_1 = \alpha e^{j\beta}$

   b. Repeat a. for $z_2 = -3 + j\ 5$

Hint: see https://www.intmath.com/complex-numbers/convert-polar-rectangular-interactive.php

4. Let $z_1 = 3\text{-}j\ 5$
   a. Find $x(t) = \mathrm{Re}[z_1 e^{-j2\pi 1000t}]$
   b. For $z_2 = 2e^{j3\pi/4}$ $y(t) = \mathrm{Re}[z_2 e^{-j2\pi 1000t}]$
5. Section 2.3 Participation activities
   2.3.1: Time shift
   2.3.2: Time shift
   2.3.3: Time scale transformation
   2.3.4: Time scale transformation
   2.3.5: Time scale.
   2.3.7: Time reversal
   2.3.9: Multiple transformations
   2.3.11: Combined transformations
6. Challenge activity 2.3.1: Signal transformation
7. Plot the signals below given x(t) defined as



a. y(t)=x(4t+8)

b. y(t) = x(4(t+2))

c. y(t) = x(-t)

d. y(t) =x(-4t-8)

8. Section 2.4 Participation activities

2.4.1 Odd and even symmetric components of a sine-pulse signal.
2.4.2 Even/odd symmetry
2.4.3 Even/odd symmetry, scaling, and time-shifting.
2.4.7 Determining period
2.4.9 Periodicity after linear transformations.

9. Identify the symmetry properties of the following signals, even, odd, neither.

a. $x_1(t) = 3t^3$

b. $x_2(t) = 3t^4$

c. $x_3(t) = 4e^{-|t|}$

d. $x_4(t) = e^{-t}$

e. $x_5(t) = 3\cos^2(100t)$

10. Find the period of the following signals.

a. $x_1(t) = 10\cos(2\pi 1000t)$

b. $x_2(t) = 10\cos(1000t)$

c. $x_3(t) = 10\sin(2\pi 1000t)$

d. $x_4(t) = e^{-j2\pi 1000t}$